Hydropyrochlore $(H_2O, \square)_2Nb_2(O, OH)_6(H_2O)$

Crystal Data: Cubic. *Point Group:* $4/m\,\bar{3}\,2/m$. As octahedra, to 1 cm, which may be corroded.

Physical Properties: *Fracture:* [Uneven] (by analogy to the pyrochlore supergroup). *Tenacity:* [Brittle.] Hardness = 4-4.5 D(meas.) = 3.40-3.48 D(calc.) = 3.40-3.44

Optical Properties: Transparent. *Color:* Greenish. *Luster:* [Vitreous to resinous.] *Optical Class:* Isotropic. n = 1.93-1.99

Cell Data: *Space Group:* $Fd\bar{3}\,m$. a = 10.604(1) Z = 8

X-ray Powder Pattern: n.d.

Chemistry:

	(1)	(2)	(3)		(1)	(2)	(3)
U_3O_8	0.10	0.08		PbO	0.01	0.02	
Nb_2O_5	78.60	80.05	75.69	MgO	0.11	0.11	
Ta_2O_5	0.06	0.11		MnO	0.08	0.06	
V_2O_5	0.02	0.03		CaO	0.41	0.13	0.12
TiO_2	4.10	4.12	5.01	BaO	0.28	0.38	
ZrO_2	0.66	0.37		SrO	2.60	1.73	1.75
SnO_2		0.06		Na_2O	0.35	0.58	
ThO_2	0.12	0.17		K_2O	2.73	2.76	2.12
Al_2O_3	0.18			F	0.38	0.11	
RE_2O_3	0.43	0.50		H_2O^+	8.54	8.37	[16.05]
Fe_2O_3	0.20	0.13		$-O = F_2$	[0.16]	[0.05]	.
FeO	0.06	0.07		Total	[99.86]	[99.89]	100.74

(1) Lueshe, Congo; original total given as 100.192%, corrected for goyazite 7.8%, ilmenite 2.0%, (rutile, brookite, anatase) 1.3%, calcite 0.9%, kaolinite 0.55%, goethite 0.3%, $H_2O^{+130^oC}$. (2) Do.; original total given as 100.066%, corrected for goyazite 7.5%, ilmenite 1.9%, (rutile, anatase) 1.1%, calcite 1.6%, kaolinite 0.4%, goethite 0.2%, $H_2O^{+130^oC}$. (3) Do.; by electron microprobe, H_2O from structure analysis; corresponds to $[(H_2O)_{0.99}Sr_{0.05}Ca_{0.01}]_{\Sigma=1.05}(Nb_{1.80}Ti_{0.20})_{\Sigma=2.00}[O_{4.06}(OH)_{1.94}]_{\Sigma=6.00}[(H_2O)_{0.86}K_{0.14}]_{\Sigma=1.00}$.

Mineral Group: Pyrochlore supergroup (general formula - $A_2B_2X_6Y$); pyrochlore group ($B = Nb^{3+}$).

Occurrence: In alluvial deposits and residual soils from a carbonatite deposit, formed from pyrochlore by the leaching of Na, Ca, and F in waters rich in K ions.

Association: Na-Ca pyrochlores, lueshite, columbite, fersmite, ilmenite, rutile, barian goyazite.

Distribution: In the Lueshe carbonatite, 150 km north of Goma, Kivu Province, Congo (Zaire).

Name: For a member of the *pyrochlore* group with a prefix to indicate dominant H_2O (*hydro*) in the *Y* site and in the *A* site. Formerly 'kalipyrochlore', now redefined.

Type Material: National Museum of Natural History, Washington, D.C., USA (136440).

References: (1) Van Wambeke, L. (1978) Kalipyrochlore, a new mineral of the pyrochlore group. Amer. Mineral., 63, 528-530. (2) Ercit, T.S., F.C. Hawthorne, and P. Černý (1994) The structural chemistry of kalipyrochlore, a "hydropyrochlore". Can. Mineral., 32, 415-420. (3) Atencio, D., M.B. Andrade, A.G. Christy, R. Gieré, and P.M. Kartashov (2010) The pyrochlore supergroup of minerals: nomenclature. Can. Mineral., 48, 673-698.