Chlorkyuygenite $Ca_{12}Al_{14}O_{32}[(H_2O)_4Cl_2]$

Crystal Data: Isometric. *Point Group*: $\bar{4}$ 3m. As tris-tetrahedral {211} crystals or rounded grains to 50 μm; as rims around wadalite crystals.

Physical Properties: *Cleavage*: None. *Fracture*: Irregular, conchoidal. *Tenacity*: n.d. Hardness = 5-5.5 VHN = 632 (50 g load). D(meas.) = n.d. D(calc.) = 2.941

Optical Properties: Transparent. *Color*: Colorless, rarely with greenish to yellowish tint. *Streak*: White. *Luster*: Vitreous.
Optical Class: Isotropic. n = 1.672(1)

Cell Data: *Space Group*: $I\bar{4}$ 3*d*. a = 12.0285(1) Z = 2

X-ray Powder Pattern: Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia. 2.690 (100), 2.455 (46), 3.007 (38), 4.91 (31), 1.668 (26), 2.196 (21), 3.215 (15)

Chemistry:	(1)		(1)
SiO_2	0.70	MgO	< 0.03
TiO_2	0.17	CaO	43.70
Al_2O_3	43.00	Cl	5.13
Fe_2O_3	4.27	H_2O	[4.42]
Y_2O_3	< 0.08	$-O = Cl_2$	1.16
		Total	100.23

(1) Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia; average of 27 electron microprobe analyses supplemented by Raman spectroscopy, H_2O from stoichiometry; corresponding to $Ca_{11.99}(Al_{12.98}Fe^{3+}_{0.82}Si_{0.18}Ti^{4+}_{0.03})_{\Sigma=14.01}O_{32}[(H_2O)_{3.77}Cl_{2.23}]_{\Sigma=6}$.

Polymorphism & Series: Forms a series with wadalite.

Mineral Group: Mayenite group.

Occurrence: An accessory mineral in Ca-humite zones of calcareous skarn xenoliths in ignimbrite, crystallized initially as chlormayenite and was altered by volcanic gases containing water vapor.

Association: Chegemite-fluorchegemite, reinhardbraunsite, srebrodolskite.

Distribution: From the Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia.

Name: *Kyuygenite* is for the locality, Kyuygen-Kaya Mountain and the prefix indicates the essential chlorine in the species.

Type Material: The Natural History Museum, Bern, Switzerland (NMBE 41538) and in the A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (3731/1).

References: (1) Galuskin, E.V., F. Gfeller, I.O. Galuskina, T. Armbruster, R. Bailau, and V.V. Sharygin (2015) Mayenite supergroup, part I: Recommended nomenclature. Eur. J. Mineral., 27, 99-111. (2) Galuskin, E.V., I.O. Galuskina, J. Kusz, F. Gfeller, T. Armbruster, R. Bailau, M. Dulski, V.M. Gazeev, N.N. Pertsev, A.E. Zadov, and P. Dzierżanowski (2015) Mayenite supergroup, part II: Chlorkyuygenite from Upper Chegem, Northern Caucasus, Kabardino-Balkaria, Russia, a new microporous mineral with "zeolitic" H_2O. Eur. J. Mineral., 27, 113-122.
(3) (2016) Amer. Mineral., 101, 1709-1710 (abs. refs. 1 & 2).