

**Crystal Data:** Isometric. *Point Group:*  $\bar{4} 3m$ . As rounded grains to 20  $\mu\text{m}$ .

**Physical Properties:** *Cleavage:* None. *Fracture:* Irregular. *Tenacity:* n.d.  
Hardness = 5-5.5 VHN = 712 (50 g load). D(meas.) = n.d. D(calc.) = 2.873

**Optical Properties:** Transparent. *Color:* Colorless, rarely with greenish to yellowish tint.  
*Streak:* White. *Luster:* Vitreous.  
*Optical Class:* Isotropic.  $n = 1.610(3)$

**Cell Data:** *Space Group:*  $\bar{I}4 3d$ .  $a = 11.966(2)$   $Z = 2$

**X-ray Powder Pattern:** Hatrurim Basin, Negev Desert, Israel.  
2.676 (100), 2.992 (61), 3.1981 (46), 2.4426 (45), 4.885 (41), 2.189 (32), 1.6594 (27)

Chemistry:	(1)		(1)
SiO <sub>2</sub>	0.89	SO <sub>3</sub>	< 0.03
Al <sub>2</sub> O <sub>3</sub>	45.00	P <sub>2</sub> O <sub>5</sub>	< 0.03
Fe <sub>2</sub> O <sub>3</sub>	2.10	Cl	< 0.02
MgO	< 0.02	F	2.38
CaO	44.64	H <sub>2</sub> O	[4.72]
Na <sub>2</sub> O	< 0.02	$\frac{-\text{O} = (\text{F} + \text{Cl})_2}{\text{Total}}$	$\frac{1.00}{98.72}$

(1) Hatrurim Basin, Negev Desert, Israel; average electron microprobe analysis supplemented by Raman spectroscopy, H<sub>2</sub>O calculated for charge balance; corresponding to Ca<sub>12.03</sub>(Al<sub>13.34</sub>Fe<sup>3+</sup><sub>0.40</sub>Si<sub>0.22</sub>) $\Sigma=13.97$ O<sub>32</sub>[(H<sub>2</sub>O)<sub>3.81</sub>F<sub>1.89</sub>(OH)<sub>0.30</sub>] $\Sigma=6$ .

**Mineral Group:** Mayenite group.

**Occurrence:** Major constituent of larnite pyrometamorphic rocks of the Hatrurim Complex (Mottled Zone). Crystallized initially as fluormayenite and was altered by vapor-enriched gases during a combustion event.

**Association:** Larnite, shulamitite, Cr-containing spinel-magnesioferrite series, ye'elimite, fluorapatite-fluorellestadite, periclase, brownmillerite, oldhamite, portlandite, hematite, hillebrandite, afwillite, foshagite, ettringite, katoite, hydrocalumite.

**Distribution:** From the Hatrurim Basin, Negev Desert, Israel.

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

**Type Material:** In Russia at the Mineralogical Museum, St. Petersburg State University, St. Petersburg (1/19465) and the Central Siberian Geological Museum, V.S. Sobolev Institute of Geology and Mineralogy, Novosibirsk (VII-87/1).

**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., F. Gfeller, T. Armbruster, I.O. Galuskina, Y. Vapnik, M. Dulski, M. Murashko, P. Dzierzanowski, V.V. Sharygin, S.V. Krivovichev, and R. Wirth (2015) Mayenite supergroup, part III: Fluormayenite, Ca<sub>12</sub>Al<sub>14</sub>O<sub>32</sub>[□<sub>4</sub>F<sub>2</sub>], and fluorkyuygenite, Ca<sub>12</sub>Al<sub>14</sub>O<sub>32</sub>[(H<sub>2</sub>O)<sub>4</sub>F<sub>2</sub>], two new minerals from pyrometamorphic rocks of the Hatrurim Complex, South Levant. *Eur. J. Mineral.*, 27, 123-136. (3) (2016) *Amer. Mineral.*, 101, 1709-1710 (abs. refs. 1 & 2).