

Fivegite

Crystal Data: Orthorhombic. *Point Group:* $mm2$. As pseudomorphs after delhayelite to 10 cm.

Physical Properties: *Cleavage:* Perfect on {100}, distinct on {010}. *Fracture:* n.d. *Tenacity:* n.d. Hardness = 4 D(meas.) = 2.42(2) D(calc.) = 2.449 Pink under LW UV; purple under SW UV.

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous to pearly. *Optical Class:* Biaxial (+). $\alpha = 1.540(2)$ $\beta = 1.542(2)$ $\gamma = 1.544(2)$ $2V(\text{meas.}) = 60(10)^\circ$ $2V(\text{calc.}) = \text{n.d.}$ *Orientation:* $X = a$, $Y = c$, $Z = b$.

Cell Data: *Space Group:* $Pm2_1n$. $a = 24.335(2)$ $b = 7.0375(5)$ $c = 6.5400(6)$ $Z = 2$

X-ray Powder Pattern: Central mine, Mt. Rasvumchorr, Khibiny massif, Kola Peninsula, Russia. 3.072 (100), 2.893 (53), 2.943 (47), 3.040 (46), 3.517 (38), 1.759 (30), 3.239 (28)

Chemistry:	(1)
Na ₂ O	0.44
K ₂ O	19.56
CaO	14.01
SrO	0.13
MnO	0.03
Fe ₂ O ₃	0.14
Al ₂ O ₃	6.12
SiO ₂	50.68
SO ₃	0.15
F	0.14
Cl	3.52
H ₂ O	4.59
$-O = (Cl,F)_2$	0.85
Total	99.66

(1) Central mine, Mt. Rasvumchorr, Khibiny massif, Kola Peninsula, Russia; average of 10 electron microprobe analyses, H₂O by Alimarin method, IR spectroscopy confirms OH; corresponding to H_{4.22}K_{3.44}Na_{0.39}Ca_{2.07}Sr_{0.01}Fe_{0.01}Al_{1.00}Si_{6.99}O_{21.15}F_{0.06}Cl_{0.82}(SO₄)_{0.02}.

Occurrence: A late-stage hydrothermal phase in high-potassium peralkaline pegmatite in urtite near the contact with nepheline-apatite rock.

Association: Delhayelite, hydrodelhayelite, pectolite, kalborsite.

Distribution: From the Central mine (southern wall, 640 m level), Mt. Rasvumchorr, Khibiny massif, Kola Peninsula, Russia.

Name: Honors Russian geologist and mining engineer, Mikhail Pavlovich Fiveg (1899-1986), the pioneer prospector of the Khibiny apatite deposits.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (3881/1).

References: (1) Pekov, I.V., N.V. Zubkova, N.V. Chukanov, A.E. Zadov, and D.Yu. Pushcharovsky (2010) Fivegite, $K_4Ca_2[AlSi_7O_{17}(O_{2-x}OH_x)][(H_2O)_{2-x}OH_x]Cl$ - a new mineral from the Khibiny alkaline massif (Kola Peninsula, Russia). *Zap. Ross. Mineral. Obshch.*, 139(4), 47-63 (in Russian with English abstract). *Geol. Ore Deposits*, 53(7), 591-603 (in English). (2) (2012) *Amer. Mineral.*, 97, 1262 (abs. ref. 1).