Strontium-apatite $(Sr,Ca)_5(PO_4)_3(OH,F)$

Crystal Data: Hexagonal. *Point Group:* $6/m$ or 6. As poorly-formed prismatic crystals, exhibiting $\{10\overline{1}0\}$, $\{10\overline{1}1\}$, $\{0001\}$, to 4 cm.

Physical Properties: *Cleavage:* Imperfect on $\{10\overline{1}0\}$. Hardness = 5 D(meas.) = 3.84 D(calc.) = 3.95

Optical Properties: Transparent. *Color:* Colorless, pale green to yellowish green.
Luster: Vitreous, greasy on fracture surfaces.
Optical Class: Uniaxial (–). $\omega = 1.651$ $\epsilon = 1.637$

Cell Data: *Space Group:* $P6_3/m$ or $P6_3$. $a = 9.565(8)$ $c = 7.115(3)$ Z = 2

X-ray Powder Pattern: Inagli massif, Russia.
2.89 (10), 3.167 (7), 2.78 (7), 2.005 (7), 1.909 (7), 1.467 (6), 2.32 (5)

Chemistry:

	(1)		(1)
SiO_2	0.90	CaO	10.80
ThO_2	0.60	SrO	46.06
P_2O_5	30.44	BaO	2.70
Al_2O_3	0.40	Na_2O	0.64
RE_2O_3	3.73	K_2O	0.10
Fe_2O_3	0.15	F	1.67
MnO	0.00	H_2O	0.61
MgO	1.64	$-O = F_2$	0.70
		Total	99.74

(1) Inagli massif, Russia; $RE_2O_3 = La_2O_3$ 26.15%, Ce_2O_3 53.9%, Pr_2O_3 5.0%, Nd_2O_3 13.8%, Sm_2O_3 0.63%, Eu_2O_3 0.1%, Gd_2O_3 0.31%, Dy_2O_3 0.06%, Er_2O_3 0.06%, Yb_2O_3 0.13%; corresponding to $(Sr_{2.96}Ca_{1.28}Mg_{0.27}RE_{0.15}Na_{0.15}Ba_{0.12}Th_{0.01}Fe_{0.01})_{\Sigma=4.95}[(P_{0.95}Si_{0.03}Al_{0.02})_{\Sigma=1.00}O_4]_{3.00}[(OH)_{0.58}F_{0.45}]_{\Sigma=1.03}$.

Mineral Group: Apatite group.

Occurrence: In alkalic pegmatite veins in a zoned ultramafic intrusion (Inagli massif, Russia).

Association: Batisite, innelite, lorenzenite, eudialyte, aegirine, eckermannite, microcline, magnesioarfvedsonite, albite (Inagli massif, Russia).

Distribution: In Russia, from the Inagli massif, 30 km west of Aldan, Sakha, and on Mt. Rasvumchorr, Khibiny massif, Kola Peninsula.

Name: As a *strontium*-dominant member of the *apatite* group; see fluorapatite.

Type Material: Vernadsky Geological Museum, Moscow, 48010; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 63197, 66210.

References: (1) Yefimov, A.S., S.M. Kravchenko, and Z.V. Vasil'yeva (1962) Strontium-apatite, a new mineral. Doklady Acad. Nauk SSSR, 142, 439–442 (in Russian). (2) (1962) Amer. Mineral., 47, 808 (abs. ref. 1). (3) Pushcharovskiy, D.Y., T.N. Nadezhina, and A.P. Khomyakov (1987) Crystal structure of strontium apatite from Khibiny. Kristallografiya (Sov. Phys. Crystal.), 32, 891–895 (in Russian). (4) Hughes, J.M., M. Cameron, and K.D. Crowley (1991) Ordering of divalent cations in the apatite structure: crystal structure refinements of natural Mn- and Sr-bearing apatite. Amer. Mineral., 76, 1857–1862.