Manganosegelerite $(Mn^{2+},Ca)(Mn^{2+},Fe^{2+},Mg)Fe^{3+}(PO_4)_2(OH)\cdot 4H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Subhedral prismatic crystals, to 0.05 mm, in granular aggregates.

Physical Properties: *Cleavage:* Imperfect on {001}. Hardness = 3–4 D(meas.) = 2.76(3) D(calc.) = 2.74

Optical Properties: Transparent to translucent. *Color:* Yellow to yellow-green. *Streak:* Yellow. *Luster:* Vitreous. *Optical Class:* Biaxial (+). *Pleochroism:* X = yellow; Z = pale yellow. *Orientation:* $X = c$; $Y = a$; $Z = b$. *Dispersion:* $r < v$, marked. $\alpha = 1.657(1)$ $\beta = 1.668(1)$ $\gamma = 1.691(2)$ 2V(meas.) = 75(5)° 2V(calc.) = 70°

Cell Data: *Space Group:* [*Pbca*] (by analogy to overite). $a = 14.89(1)$ $b = 18.79(1)$ $c = 7.408(5)$ Z = 8

X-ray Powder Pattern: Mt. Vasin-Myl'k, Kola Peninsula, Russia.
9.39 (10), 2.86 (9), 4.70 (5), 1.966 (5), 1.880 (5), 2.97 (4), 2.60 (4)

Chemistry:

	(1)
P_2O_5	33.21
Al_2O_3	1.48
Fe_2O_3	22.61
MnO	16.37
MgO	2.83
CaO	5.14
H_2O	[18.36]
Total	[100.00]

(1) Mt. Vasin-Myl'k, Kola Peninsula, Russia; by electron microprobe; total Fe as Fe_2O_3, total Mn as MnO, H_2O by difference, Fe^{2+}:Fe^{3+} for charge balance, $(OH)^{1-}$ and H_2O confirmed by IR; then corresponding to $(Mn_{0.61}Ca_{0.39})_{\Sigma=1.00}(Mn_{0.38}Fe^{2+}_{0.33}Mg_{0.30})_{\Sigma=1.01}(Fe^{3+}_{0.88}Al_{0.12})_{\Sigma=1.00}(PO_4)_{2.00}(OH)_{1.02}\cdot 4.04H_2O$.

Mineral Group: Overite group.

Occurrence: In fractures in granite pegmatite.

Association: Mitridatite, lun'okite, eosphorite, kingsmountite, manganoan gordonite.

Distribution: On Mt. Vasin-Myl'k, Voron'i massif, Kola Peninsula, Russia.

Name: As the *manganese* analog of *segelerite*.

Type Material: Mining Institute, St. Petersburg, 1592/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Voloshin, A.V., Y.A. Pakhomovskii, and F.N. Tyusheva (1992) Manganosegelerite $(Mn,Ca)(Mn,Fe,Mg)Fe^{3+}(PO_4)_2(OH)\cdot 4H_2O$ – a new phosphate of the overite group from granitic pegmatites of the Kola Peninsula. Zap. Vses. Mineral. Obshch., 121(2), 95–103 (in Russian). (2) (1994) Amer. Mineral., 79, 185–186 (abs. ref. 1).