Seidozerite $(Na,Ca)_2(Zr,Ti,Mn)_2Si_2O_7(O,F)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$ or m. As radiating crystals, elongated along [010], to 5 cm, showing {001}, {100}, {010}, {011}, {111}, and {203}.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Brittle. Hardness = 4–5
D(meas.) = 3.472 D(calc.) = 3.87

Optical Properties: Opaque, translucent in thin fragments. *Color:* Brownish red to reddish yellow; red where translucent. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Pleochroism:* Intense; X = dark red; Y = red; Z = light yellow. *Orientation:* $X = b$; $Z = a$; $Y \wedge c = 13°$. *Dispersion:* $r > v$, strong. *Absorption:* $X > Y > Z$.
$\alpha = 1.725$ $\beta = 1.758$ $\gamma = 1.830$ 2V(meas.) = 68°

Cell Data: *Space Group:* $P2/c$ or Pc. $a = 5.53(3)$ $b = 7.10(4)$ $c = 18.30(10)$
$\beta = 102°43'$ Z = 4

X-ray Powder Pattern: Lovozero massif, Russia.
2.97 (10), 2.87 (7), 1.830 (7), 2.58 (4), 1.633 (4), 2.43 (3), 2.25 (3)

Chemistry:

	(1)		(1)
SiO_2	31.40	MnO	4.22
TiO_2	13.16	MgO	1.79
ZrO_2	23.14	CaO	2.80
Al_2O_3	1.38	Na_2O	14.55
Fe_2O_3	2.85	F	3.56
Nb_2O_5	0.60	H_2O	0.60
FeO	1.06	$-O = F_2$	1.49
		Total	99.62

(1) Lovozero massif, Russia; corresponds to $(Na_{1.79}Ca_{0.19})_{\Sigma=1.98}(Zr_{0.72}Ti_{0.63}Mn_{0.23}Mg_{0.17}Fe^{3+}_{0.13}Al_{0.10}Fe^{2+}_{0.06}Nb_{0.02})_{\Sigma=2.06}Si_{2.00}O_7(O_{1.28}F_{0.72})_{\Sigma=2.00}$.

Occurrence: In thin veins in nepheline syenite pegmatites in a differentiated alkalic massif (Lovozero massif, Russia).

Association: Microcline, aegirine, nepheline, apatite, pyrochlore, magnetite, ilmenite, titanian låvenite, eudialyte (Lovozero massif, Russia).

Distribution: In Russia, in the Lovozero massif, near the Muruai and Uel'kuai Rivers, Seidozero region, Kola Peninsula, and in the Burpala massif, 120 km north of Lake Baikal, eastern Siberia. From Val Giuv, Graübunden, Switzerland.

Name: For the Lake Seidozero region, Kola Peninsula, Russia, near which the mineral occurs.

Type Material: Vernadsky Geological Museum, 45148; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 59965, vis4318, vis4319.

References: (1) Semenov, E.I., M.E. Kazakova, and V.I. Simonov (1958) A new zirconium mineral, seidozerite, and other minerals of the wöhlerite group in alkalic pegmatites. Zap. Vses. Mineral. Obshch., 87, 590–597 (in Russian). (2) (1959) Amer. Mineral., 44, 467–468 (abs. ref. 1); 910 (errata ref. 2). (3) Simonov, V.I. and N.V. Belov (1959) The determination of the structure of seidozerite. Kristallografiya (Sov. Phys. Crystal.), 4, 1463–175 (in Russian). (4) Skszat, S.M. and V.I. Simonov (1966) The structure of calcium seidozerite. Kristallografiya (Sov. Phys. Crystal.), 10, 591–595 (in Russian).