

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals acicular, to 2 mm; in radiating clusters.

Physical Properties: *Cleavage:* Perfect on {100}, {010}, and {001}. *Tenacity:* Brittle. Hardness = 3
D(meas.) = 2.32-2.39 D(calc.) = [2.51]

Optical Properties: Semitransparent. *Color:* Gold, brown, reddish brown, yellow, tan, rose, lavender, bronze. *Streak:* Yellow. *Luster:* Vitreous, may be silky.
Optical Class: Biaxial (+). *Pleochroism:* Distinct; X = nearly colorless; Y = yellowish; Z = golden brown. *Orientation:* $Z \wedge c = 0^\circ\text{-}30^\circ$. $\alpha = 1.540(2)$ $\beta = 1.542(2)$ $\gamma = 1.550(2)$ $2V(\text{meas.}) = \text{n.d.}$
 $2V(\text{calc.}) = 53^\circ$

Cell Data: *Space Group:* $C2/m$. $a = 15.1(1)$ $b = 17.6(1)$ $c = 5.290(4)$ $\beta = 100.5(2)^\circ$ $Z = 2$

X-ray Powder Pattern: Lovozero massif, Russia.
11.4 (100), 2.939 (100), 2.650 (100), 4.5 (80), 3.8 (60b), 2.482 (60), 1.640 (60)

Chemistry:	(1)		(1)
SiO ₂	46.20	MnO	15.00
TiO ₂	3.11	MgO	0.20
ZrO ₂	0.16	CaO	1.24
Al ₂ O ₃	0.12	Na ₂ O	11.24
RE ₂ O ₃	0.16	K ₂ O	0.17
Fe ₂ O ₃	1.86	H ₂ O ⁺	8.01
(Nb,Ta) ₂ O ₅	0.44	H ₂ O ⁻	11.36
FeO	0.37	<u>CO₂</u>	<u>0.40</u>
		Total	100.04

(1) Lovozero massif, Russia.

Mineral Group: Palygorskite group.

Occurrence: On the walls of fractures filled with nepheline in alkalic pegmatite in a differentiated alkalic massif (Lovozero massif, Russia).

Association: Nepheline, aegirine, mountainite, natrolite, zorite (Lovozero massif, Russia); aegirine, albite, nepheline, sodalite, sérandite, analcime, ancylite, epididymite, eudialyte, nenadkevichite (Mont Saint-Hilaire, Canada).

Distribution: In the Jubilee pegmatite, Mt. Karnasurt, near the Ilmajok River valley, Lovozero massif, and in the Khibiny massif, Kola Peninsula, Russia. At Mont Saint-Hilaire, Quebec, Canada.

Name: Honors the scientists, led by Thor Heyerdahl, crewing the papyrus ship *Ra* (1969-1970).

Type Material: Geology Museum, Kola Branch, Academy of Sciences, Apatity, 3206, 3271; Mineralogical Museum, St. Petersburg University, 19047; Mining Institute, St. Petersburg, 1060/1-4; and the A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 74489.

References: (1) Mer'kov, A.N., I.V. Bussen, E.A. Goiko, E.A. Kul'chitskaya, Y.P. Men'shikov, and A.P. Nedorezova (1973) Raite and zorite, new minerals from the Lovozero Tundra. *Zap. Vses. Mineral. Obshch.*, 102, 54-62 (in Russian). (2) (1973) *Amer. Mineral.*, 58, 1113-1114 (abs. ref. 1). (3) Khomyakov, A.P., E.M. Es'kova, G.E. Cherepivskaya, V.V. Kaptsov, and A.D. Timchenko (1982) New data on raite. *Nov. Dannye Miner.*, 30, 205-207 (in Russian). (4) (1983) *Chem. Abs.*, 219080 (abs. ref. 3). (5) Mandarino, J.A. and V. Anderson (1989) *Montegian treasures*. Cambridge Univ. Press, 174. (6) Pushcharovskii, D.Y., I.V. Pekov, J. Pluth, J. Smith, G. Ferraris, S.A. Vinogradova, A.V. Arakcheeva, S.V. Soboleva, and E.I. Semenov (1999) Raite, manganonorderite-(Ce), and ferronordite-(Ce) from the Lovozero Massif: Crystal structures and mineralogical geochemistry. *Crystallographic Reports* 44(4), 565-574.