

Crystal Data: Monoclinic. *Point Group:* 2/m. As tabular crystals to 0.4 mm.

Physical Properties: *Cleavage:* One good direction. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 5.478

Optical Properties: Transparent to translucent. *Color:* Yellow. *Streak:* White. *Luster:* Vitreous to greasy.

Optical Class: Biaxial (+). $\alpha = 1.768(5)$ $\beta = 1.771(3)$ $\gamma = >1.808$ $\gamma(\text{calc.}) = 1.818$
 $2V(\text{meas.}) = 29(8)^\circ$ *Orientation:* $X = b$, $Z \wedge c = 9^\circ$ (β obtuse).

Cell Data: *Space Group:* $P2_1/n$. $a = 6.739(3)$ $b = 6.951(3)$ $c = 6.462(3)$ $\beta = 104.03(4)^\circ$ $Z = 4$

X-ray Powder Pattern: Annie Claim #3, near Greer Lake, southeastern Manitoba, Canada. 3.065 (100), 2.857 (90), 4.164 (80), 3.264 (70), 4.647 (50), 5.191 (40), 3.492 (40B)

Chemistry:	(1)	(2)	(1)	(2)
CaO	2.75		Dy ₂ O ₃	1.18
PbO	2.14		Yb ₂ O ₃	0.02
Y ₂ O ₃	1.29		Lu ₂ O ₃	0.05
La ₂ O ₃	2.10		ZrO ₂	0.71
Ce ₂ O ₃	10.04		ThO ₂	16.27
Pr ₂ O ₃	1.58		UO ₂	0.62
Nd ₂ O ₃	6.03		SiO ₂	1.53
Sm ₂ O ₃	13.02	71.07	<u>P₂O₅</u>	<u>27.48</u> <u>28.93</u>
Gd ₂ O ₃	12.06		Total	100.01 100.00
Tb ₂ O ₃	1.14			

(1) Annie Claim #3, near Greer Lake, southeastern Manitoba, Canada; average of 3 electron microprobe analyses; corresponding to (Sm_{0.18}Gd_{0.16}Th_{0.15}Ce_{0.15}Ca_{0.12}Nd_{0.09}La_{0.03}Y_{0.03}Pr_{0.02}Pb_{0.02}Tb_{0.02}Dy_{0.02}Zr_{0.02}U_{0.01})_{Σ=1.01}(P_{0.94}Si_{0.06})O₄. (2) Sm(PO₄).

Mineral Group: Monazite group.

Occurrence: From the inner intermediate zone of a lepidolite-subtype granitic pegmatite.

Association: Quartz, albite, lithian muscovite, manganocolumbite (Annie Claim); zircon, allanite, ilmenite, magnetite, hematite, fergusonite, xenotime (Shimo-ono).

Distribution: From the Annie Claim no. 3, near Greer Lake, near the Winnipeg River, southeastern Manitoba, Canada. From the Shimo-ono ilmenite-series granitic pegmatite, Ibaraki, Japan.

Name: The suffix designates the Sm-dominant analog of *monazite*-(Ce), *monazite*-(La), and *monazite*-(Nd).

Type Material: R.B. Ferguson Museum of Mineralogy, University of Manitoba, Winnipeg, Canada (M7181).

References: (1) Masau, M., P. Černý, M.A. Cooper, R. Chapman, and J.D. Grice (2002) Monazite-(Sm), a new member of the monazite group from the Annie claim no. 3 granitic pegmatite, southeastern Manitoba. *Can. Mineral.*, 40, 1649-1655. (2) (2003) *Amer. Mineral.*, 88(11), 1838 (abs. ref. 1). (3) Hoshino, M., Y. Watanabe, and S. Ishihara (2012) Crystal chemistry of monazite from the granitic rocks of Japan: petrogenic implications. *Can. Mineral.*, 50(5), 1331-1346.