Parakeldyshite $Na_2ZrSi_2O_7$

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As cleavable masses, to several cm; three cleavages result in a pseudorhombohedral aspect. *Twinning:* Polysynthetic on {100}, with several other sets intersecting.

Physical Properties: *Cleavage:* Perfect on {001}; very good on {110} and {1$\bar{1}$0}; good on {011}. Hardness = 5.5–6 D(meas.) = 3.37–3.39 D(calc.) = 3.40 Fluoresces deep cream under SW UV and a very weak cream under LW UV; alters readily to a snow-white coating.

Optical Properties: Translucent. *Color:* White, with a light bluish tinge. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Orientation:* $X \simeq b$; $Y \simeq c$; $Z \simeq a$. $\alpha = 1.670$ (α') $\beta = 1.692$–1.697 (β') $\gamma = 1.713$–1.718 (γ') 2V(meas.) = 83°–84° 2V(calc.) = 88°

Cell Data: *Space Group:* $P\bar{1}$ (probable). $a = 5.419(1)$ $b = 6.607(2)$ $c = 8.806(2)$ $\alpha = 71.50(2)°$ $\beta = 87.15(3)°$ $\gamma = 85.63(2)°$ Z = 2

X-ray Powder Pattern: Bratthagen, Norway.
3.963 (10), 2.913 (9), 4.234 (7), 2.703 (7), 6.00 (6), 2.718 (6), 2.905 (5)

Chemistry:

	(1)	(2)
SiO_2	38.80	39.22
TiO_2	trace	0.13
ZrO_2	38.70	40.07
HfO_2	0.60	
Al_2O_3		0.21
Fe_2O_3	0.29	0.18
MgO		0.03
CaO	3.50	0.27
Na_2O	17.97	19.33
K_2O	1.13	0.25
H_2O^+	trace	0.48
H_2O^-		0.00
Total	100.39	100.17

(1) Khibiny massif, Russia. (2) Bratthagen, Norway; corresponds to $[Na_{1.90}(H_3O)_{0.05}K_{0.02}Ca_{0.02}]_{\Sigma=1.99}(Zr_{0.99}Fe_{0.01})_{\Sigma=1.00}(Si_{1.99}Al_{0.01})_{\Sigma=2.00}O_7$.

Occurrence: As masses in nepheline syenite pegmatites which cut a foyaite (Bratthagen, Norway).

Association: Alkalic feldspar, nepheline, aegirine, pyrophanite, loparite, biotite (Bratthagen, Norway); sodalite, analcime, tetranatrolite, aegirine, eudialyte (Mont Saint-Hilaire, Canada).

Distribution: From Mt. Takhtarvumchorr and elsewhere in the Khibiny massif, and on Mt. Alluaiv and elsewhere in the Lovozero massif, Kola Peninsula, Russia. At Bratthagen, near Larvik, Norway. From Mont Saint-Hilaire, Quebec, Canada.

Name: From the Greek *para*, for *near*, and its relation to *keldyshite*.

Type Material: Geology Museum, Kola Branch, Academy of Sciences, Apatity, 3270, 4457; Mining Institute, St. Petersburg, 1079/1–2, vis4361; Vernadsky Geological Museum, Moscow, 517151; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 78461, 78462.

References: (1) Khomyakov, A.P. (1977) Parakeldyshite – a new mineral. Doklady Acad. Nauk SSSR, 237, 703–705 (in Russian). (2) (1978) Chem. Abs., 92335 (abs. ref. 1). (3) Raade, G. and M.H. Mladeck (1977) Parakeldyshite from Norway. Can. Mineral., 15, 102–107. (4) (1979) Amer. Mineral., 64, 656–657 (abs. ref. 3). (5) Mandarino, J.A. and V. Anderson (1989) Monteregian Treasures. Cambridge Univ. Press, 158.