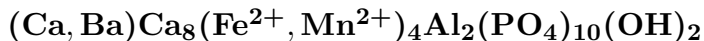


Samuelsonite



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Crystal Data: Monoclinic. *Point Group:* $2/m$. Prismatic crystals, elongated and striated \parallel [010], to 4 cm, flattened on {001}, showing large {100}, {001}, {101}, $\{\bar{1}01\}$, terminated by {012}, $\{\bar{1}12\}$, $\{\bar{2}11\}$, a few others, terminations may be ragged.

Physical Properties: *Cleavage:* On {001}, fair. *Hardness* = > 5 *D*(meas.) = 3.24–3.35 *D*(calc.) = 3.355

Optical Properties: Transparent to translucent. *Color:* Colorless, white.

Luster: Subadamantine, may be vitreous to resinous.

Optical Class: Biaxial (+). *Orientation:* $Y = b$; OAP $\sim \perp$ {001} cleavage, extinction inclined 22° . *Dispersion:* $r < v$, weak. $\alpha = 1.645\text{--}1.648$ $\beta = 1.650\text{--}1.655$ $\gamma = 1.655\text{--}1.667$
 $2V$ (meas.) = $70^\circ\text{--}85^\circ$ $2V$ (calc.) = 75°

Cell Data: *Space Group:* $C2/m$. $a = 18.495(5)$ $b = 6.805(2)$ $c = 14.000(5)$
 $\beta = 112.75(6)^\circ$ $Z = 2$

X-ray Powder Pattern: Palermo #1 mine, New Hampshire, USA.
3.058 (10), 2.657 (7b), 3.032 (6), 1.706 (6), 3.389 (5), 2.734 (5), 3.245 (4)

Chemistry:	(1)	(2)		(1)	(2)
P ₂ O ₅	43.10	43.79	SrO	0.44	
Al ₂ O ₃	4.80	6.18	BaO	2.04	2.31
Fe ₂ O ₃		0.07	Li ₂ O		0.43
FeO	11.30	7.92	Na ₂ O	0.21	0.35
MnO	7.20	8.91	K ₂ O	0.02	
MgO	0.12	0.07	H ₂ O ⁺	3.00	1.85
CaO	28.30	28.41	Total	100.53	100.29

(1) Palermo #1 mine, New Hampshire, USA; by electron microprobe, total Fe as FeO, total Mn as MnO; corresponds to $(\text{Ba}_{0.21}\text{Ca}_{0.10}\text{Sr}_{0.07})_{\Sigma=0.38}\text{Ca}_{8.00}(\text{Fe}_{2.52}\text{Mn}_{1.63}\text{Na}_{0.11}\text{Mg}_{0.04})_{\Sigma=4.30}\text{Al}_{1.52}(\text{PO}_4)_{9.76}(\text{OH})_{5.35}$. (2) Buranga pegmatite, Rwanda; corresponds to $(\text{Ba}_{0.24}\text{Ca}_{0.21})_{\Sigma=0.45}\text{Ca}_{8.00}(\text{Mn}_{2.04}\text{Fe}_{1.78}^{2+}\text{Li}_{0.46}\text{Na}_{0.18}\text{Mg}_{0.03})_{\Sigma=4.49}(\text{Al}_{1.97}\text{Fe}_{0.02}^{3+})_{\Sigma=1.99}(\text{PO}_4)_{10.00}(\text{OH})_{2.00} \cdot 0.68\text{H}_2\text{O}$.

Occurrence: A secondary mineral in complex zoned granite pegmatites.

Association: Childrenite, hydroxylapatite, arrojadite, whitlockite, carbonate-apatite, laeuite, Fe–Mn oxides (Palermo #1 mine, New Hampshire, USA); trolleite, bertossaite, scorzalite, apatite, burangaite, gatumbaite (Buranga pegmatite, Rwanda).

Distribution: From the Palermo #1 mine, near North Groton, Grafton Co., New Hampshire, USA. In the Buranga pegmatite, near Gatumba, Rwanda.

Name: Honoring Peter B. Samuelson (1941–), Rumney, New Hampshire, USA, for his efforts in field collecting of pegmatite minerals.

Type Material: National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 128071.

References: (1) Moore, P.B., A.J. Irving, and A.R. Kampf (1975) Foggite, $\text{CaAl}(\text{OH})_2(\text{H}_2\text{O})[\text{PO}_4]$; goedkenite, $(\text{Sr, Ca})_2\text{Al}(\text{OH})[\text{PO}_4]_2$; and samuelsonite, $(\text{Ca, Ba})\text{Fe}_2^{2+}\text{Mn}_2^{2+}\text{Ca}_8\text{Al}_2(\text{OH})_2[\text{PO}_4]_{10}$; three new species from the Palermo No. 1 pegmatite, North Groton, New Hampshire. *Amer. Mineral.*, 60, 957–964. (2) Moore, P.B. and T. Araki (1977) Samuelsonite: its crystal structure and relation to apatite and octacalcium phosphate. *Amer. Mineral.*, 62, 229–245. (3) Fransolet, A.-M., O. von Knorring, and F. Fontan (1992) A new occurrence of samuelsonite in the Buranga pegmatite, Rwanda. *Bull. Geol. Surv. Finland*, 64(1), 13–21.

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