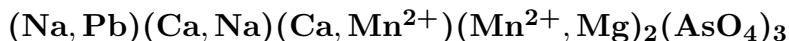


**Caryinite**

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As cleavable masses; fine-grained massive, in veins to 10 cm.**Physical Properties:** *Cleavage:* On  $\{110\}$  and  $\{010\}$ , distinct. *Hardness* = 4  
D(meas.) = 4.29 D(calc.) = [4.45]**Optical Properties:** Subtranslucent. *Color:* Nut-brown to yellowish brown; in transmitted light, pale yellow-brown. *Luster:* Greasy.*Optical Class:* Biaxial (+). *Orientation:*  $X = c$ ;  $Y = a$ ;  $Z = b$ . *Dispersion:*  $r > v$ , slight.  
 $\alpha = 1.776(5)$   $\beta = 1.780(5)$   $\gamma = 1.805(5)$   $2V(\text{meas.}) = 41(3)^\circ$ **Cell Data:** *Space Group:*  $I2/a$ .  $a = 6.855(2)$   $b = 13.147(3)$   $c = 11.479(4)$   
 $\beta = 98.97(2)^\circ$   $Z = 4$ **X-ray Powder Pattern:** Långban, Sweden.

2.868 (10), 2.849 (10), 2.686 (5), 3.03 (3), 3.29 (2), 3.14 (2), 2.903 (2)

<b>Chemistry:</b>	(1)	(2)	(3)		(1)	(2)	(3)
P <sub>2</sub> O <sub>5</sub>	0.19	0.8	0.95	MgO	3.09	3.1	3.24
As <sub>2</sub> O <sub>5</sub>	49.78	47.8	48.84	CaO	12.12	10.8	10.82
V <sub>2</sub> O <sub>5</sub>			0.24	BaO	1.03	0.8	0.17
SiO <sub>2</sub>	0.21			Na <sub>2</sub> O	5.16	4.18	4.82
FeO	0.54	0.5	0.10	K <sub>2</sub> O	0.37		
MnO	18.66	19.1	17.90	Cl	trace		
PbO	9.21	11.5	12.73	H <sub>2</sub> O	0.53		
				<b>Total</b>	<b>100.89</b>	<b>98.6</b>	<b>99.81</b>

(1) Långban, Sweden; SiO<sub>2</sub> determined separately and thought to be in berzeliite. (2) Do.; by electron microprobe, total Fe as FeO, Mn as MnO, Na determined by flame photometry. (3) Do.; by electron microprobe, average of two analyses, total Fe as FeO, Mn as MnO; cations apportioned by structure refinement, corresponding to  $(\text{Na}_{0.61}\text{Pb}_{0.39})_{\Sigma=1.00}(\text{Ca}_{0.56}\text{Na}_{0.43}\text{Ba}_{0.01})_{\Sigma=1.00}(\text{Ca}_{0.74}\text{Mn}_{0.26}^{2+})_{\Sigma=1.00}(\text{Mn}_{1.45}^{2+}\text{Mg}_{0.54}\text{Fe}_{0.01}^{3+})_{\Sigma=2.00}[(\text{AsO}_4)_{2.89}(\text{PO}_4)_{0.09}(\text{VO}_4)_{0.02}]_{\Sigma=3.00}$ .

**Mineral Group:** Alluaudite group.**Occurrence:** In veinlets in skarn in a metamorphosed Fe–Mn orebody.**Association:** Berzeliite, adelite, hedyphane, hausmannite, rhodonite, diopside, calcite.**Distribution:** At Långban, Värmland, Sweden.**Name:** From the Greek for *nut-brown*, for its common color.**Type Material:** Swedish Museum of Natural History, Stockholm, Sweden, 221444.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 683–684. (2) Boström, K. (1957) The chemical composition and symmetry of caryinite. *Arkiv. Mineral. Geol.*, 2(20), 333–336. (3) Moore, P.B. (1968) Contributions to Swedish mineralogy. I. Studies on the basic arsenates of manganese: retzian, hema fibrite, synadelphite, arsenoclasite, arsenioleite, and akrochordite. *Arkiv. Mineral. Geol.*, 4(5), 425–444. (4) Dunn, P.J. and D.R. Peacor (1987) New data on the relation between caryinite and arsenioleite. *Mineral. Mag.*, 51, 281–284. (5) Ercit, T.S. (1993) Caryinite revisited. *Mineral. Mag.*, 57, 721–727.