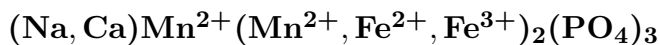


**Varulite**

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**Crystal Data:** Monoclinic. *Point Group:*  $[2/m]$  (by analogy to hagendorfite). Nodular, granular, massive.**Physical Properties:** *Cleavage:* Good on  $\{100\}$ ; distinct on  $\{010\}$ . Hardness = 5  
D(meas.) = 3.5–3.6 D(calc.) = n.d.**Optical Properties:** Semitransparent. *Color:* Dull olive-green, brownish on oxidation.  
*Luster:* Vitreous.*Optical Class:* Biaxial (+). *Pleochroism:* X = yellowish green; Z = grass-green. *Orientation:* Y = b. *Dispersion:*  $r > v$ .  $\alpha = 1.708\text{--}1.720$   $\beta = \text{n.d.}$   $\gamma = 1.722\text{--}1.732$   $2V(\text{meas.}) = 70^\circ$ **Cell Data:** *Space Group:* n.d. Z = n.d.**X-ray Powder Pattern:** Varuträsk pegmatite, Sweden.  
2.737 (10), 3.498 (4), 2.556 (4), 6.35 (3), 5.46 (3), 3.12 (3), 2.909 (3)

<b>Chemistry:</b>	(1)	(2)	(1)	(2)
P <sub>2</sub> O <sub>5</sub>	42.80	44.93	Li <sub>2</sub> O	0.88
Al <sub>2</sub> O <sub>3</sub>	0.36		Na <sub>2</sub> O	7.12
Fe <sub>2</sub> O <sub>3</sub>	8.35	5.32	K <sub>2</sub> O	0.12
FeO	7.52	11.03	F	0.06
MnO	25.30	25.31	H <sub>2</sub> O <sup>+</sup>	0.75
MgO		0.13	H <sub>2</sub> O <sup>-</sup>	0.14
CaO	4.86	2.30	insol.	1.80
			<hr/>	
			Total	100.06
				99.97

(1–2) Varuträsk pegmatite, Sweden.

**Polymorphism & Series:** Forms a series with hagendorfite.**Mineral Group:** Alluaudite group.**Occurrence:** In complex granite pegmatites, either as a primary mineral or an alteration product of triphylite–lithiophilite; as nodules in shale.**Association:** Alluaudite.**Distribution:** In Sweden, in the Varuträsk pegmatite, 15 km northwest of Skellefteå, Västerbotten, and from Skruppetorp, Östergötland. In Finland, at Hunnako and Kaatiala, near Kuertane. From the Mangualde pegmatite, near Mesquitela, Portugal. Found in the Big Fish River and Boundary Creek areas, Yukon Territory, Canada.**Name:** For its initially noted occurrence in the Varuträsk pegmatite, Sweden.**Type Material:** n.d.**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 669–670. (2) Moore, P.B. and J. Ito (1979) Alluaudites, wyllieites, arrojadites: crystal chemistry and nomenclature. *Mineral. Mag.*, 43, 227–235. (3) Lindberg, M.L. (1950) Arrojadite, hühnerkobelite, and graftonite. *Amer. Mineral.*, 35, 59–76.